Earth's natural pulsed electromagnetic field (ENPEMF) anomalies, as earthquake precursors

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Institute of Monitoring of Climatic and Ecological Systems of the Siberian Branch of the Russian Academy of Sciences (IMCES SB RAS) develops Earth natural pulsed electromagnetic field (ENPEMF) monitoring technologies for dangerous geological processes (DGP) estimation applications.

Currently, mutli-channel geophysical recorders of MGR type are usefully employed in the automated systems for the landslide slope stability estimation on the Gazprom pipeline routes from Kamchatka to Caucasus. Their operational concept is based on recording ENPEMF pulse flow intensity in VLF band.

Authors suggest a concept of a harware-software solution to monitor different scale geodynamic lithosphere processes using EMPEMF pulse flow intensity temporal variations parameters with a signal source bearing determination capacity.

Based on earthquake preparation mechanics it is fair to assume that mechanical stress wave, propagating in all directions from epicentre, supresses mechanoelectric convertion sources at EMPEMF recording sites, but that wave's energy magnitude is sometimes not sufficient to supress stress-strained state of the rocks, provided by the local landslide slope geodynamic processes.

We have concept-proved a model stations network for monitoring different scale geodynamic lithosphere processes using EMPEMF method with a signal source bearing capacity.

It has been established that earthquake forecasting method, described in the patent # 2238575 "Earthquake forecasting approach", could be improved by including more forecasting features into the analysis, namely distinguishing earlier stages of geodynamic development and determining a bearing of electromagnetic signal source based on EMPEMF pulse flow intensity temporal variations parameters.

For the first time, we registered three stages of upcoming earthquakes preparation, which took place at September the 5th 2018 in Chelyabinsk region and November the 6th in Georgia, not solely based on ENMEMF pulse flow intensity, but using a bearing estimation of incoming signal as well.